PATENT ABSTRACTS OF JAPAN

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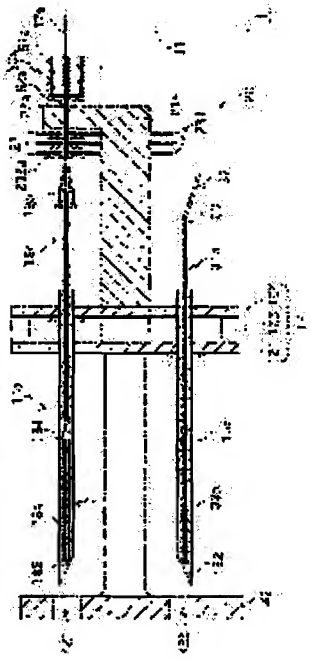
(54) SUTURING IMPLEMENT FOR LIVING BODY, AND SUTURING METHOD FOR LIVING BODY

(57)Abstract:

PROBLEM TO BE SOLVED: To improve the operability in a suturing implement for living body and a suturing method for living body for fixing a stomach lining with a suture.

SOLUTION: The main body unit 10 of a stomach lining fixing implement 1 is constituted of a holding cylinder 11, a holder section 12 which is provided near the front end of the holding cylinder 11, first hollow puncturing needles 14a and 14b and second hollow puncturing needles 15a and 15b which are held by the holder section 12, a suture feeding mechanism 20 which feeds sutures 17a and 17b to the distal end sides of the hollow puncturing needles 14a and 14b, and a pulling-out implement 30 which pulls in the sutures 17a and 17b from the distal ends of the hollow puncturing needles 15a and 15b and so forth. The inserts 18a and 18b adsorbed by the pulling-out implement 30 are attached to the distal end sections of the sutures 17a and 17b. The pulling-out implement 30 is equipped with rod sections 31a and 31b, and adsorbors 33a and 33b are provided on respective distal end sections of the rod sections 31a and 31b. The passing elements 18a and 18b, and the adsorbors 33a and 33b are equipped with magnets which attract each other.



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JAPANESE [JP,2006-025932,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1]
An insertion means to insert the point of a suture in a living body's section for a suture,
An adsorption means to adsorb the point of said inserted suture the department for a suture,
The suture implement for living bodies characterized by having the drawer means which pulls out the point of the suture to which it stuck with said suture adsorption means from said section for a suture.
[Claim 2]
The 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with which each has an aisleway and carries out the puncture of the section for a suture with a juxtaposition posture,
It connects with a suture, is contained in the aisleway of said 1st hollow reusable puncture needle in front of the puncture, and is the insertion object which can be inserted into a path from the tip of said 2nd hollow reusable puncture needle,
The suture implement for living bodies according to claim 1 characterized by having the adsorbent which adsorbs said insertion object extruded with said extrusion means when the front end is in the condition of having exposed from said 2nd hollow reusable puncture needle.
[Claim 3]
Either [at least] said insertion object or said adsorbent is the suture implement for living bodies according to claim 2 characterized by being a magnet.
[Claim 4]
Said insertion object and said adsorbent are a suture implement for living bodies according to claim 2 characterized by having the property which pays well mutually and being constituted by static electricity.
[Claim 5]
To said adsorbent which has a tip in the condition of having exposed from the aisleway tip side of said 2nd hollow reusable puncture needle
The suture implement for living bodies according to claim 2 characterized by having an approach means to make said insertion object extruded from said 1st hollow reusable puncture needle approach.
[Claim 6]
The suture implement for living bodies according to claim 2 characterized by having the holder which holds the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with a juxtaposition posture.
[Claim 7]
The extrusion means which extrudes said insertion object from the aisleway tip of said 1st hollow reusable puncture needle to the method of outside,
The suture implement for living bodies according to claim 2 characterized by having the lead-in means which draws said adsorbent in the condition of having adsorbed said insertion object in an aisleway from the tip of said 2nd hollow reusable puncture needle.
[Claim 8]

Said extrusion means,
The suture implement for living bodies according to claim 7 characterized by having the slide rod which slides the aisleway of said 1st hollow reusable puncture needle, and extrudes the insertion object concerned from the aisleway of the 1st hollow reusable puncture needle to a tip side in contact with the back end of said insertion object while having the aisleway in which said suture is made to insert.
[Claim 9]
The front end section of said slide rod,
The suture implement for living bodies according to claim 8 characterized by being formed with the elastic body.
[Claim 10]
Said slide rod,
The suture implement for living bodies according to claim 9 characterized by having the property crooked in the tip side of said 2nd hollow reusable puncture needle when the point is projected from the tip of said 1st hollow reusable puncture needle.
[Claim 11]
It is the suture implement for living bodies according to claim 2 characterized by containing said suture in the 1st hollow reusable puncture needle where the near part connected with said insertion object is bent before a puncture.
[Claim 12]
Said insertion object is a suture implement for living bodies according to claim 9 characterized by being cylindrical and connecting said suture to the end section.
[Claim 13]
Said insertion object,
The suture implement for living bodies according to claim 12 characterized by having the cross-section configuration which a part of circle cut and lacked.
[Claim 14]
The end section of said insertion object is formed in tubed,
Said suture is joined to said insertion object within the cylinder of the end section concerned,
The bending part in said suture is a suture implement for living bodies according to claim 12 characterized by being contained in the rockable condition centering on the part joined to said insertion object by the space in a cylinder of said end section.
[Claim 15]
The suture implement for living bodies according to claim 14 characterized by forming in the barrel wall of said end section slitting into which the bending part concerned enters.
[Claim 16]
The insertion step which inserts the point of a suture in a living body's section for a suture,
The adsorption step which adsorbs the point of the inserted suture,
The suture approach for living bodies characterized by having the drawer step which pulls out the point of the suture to which it stuck with said adsorption means from said section for a suture.
[Claim 17]
The puncture step which carries out the puncture of the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with which each has an aisleway to a living body's section for a suture with a juxtaposition posture,
The extrusion step which extrudes the insertion object connected with the suture from the inside of the aisleway of said 1st hollow reusable puncture needle after said puncture step at a tip side,
The arrangement step which arranges the adsorbent which adsorbs said insertion object so that the front end may be exposed from the tip of the 2nd hollow reusable puncture needle,
The approach step made to adsorb by making the insertion object extruded at said extrusion step approach the adsorbent arranged at said arrangement step,
The suture approach for living bodies characterized by consisting of a lead-in step which draws said adsorbent in the condition of having adsorbed said insertion object in an aisleway from the tip of said

2nd hollow reusable puncture needle.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[Field of the Invention]
[0001]
This invention relates to the stomach-walls fastener and the stomach-walls fixed approach for suturing especially an abdominal wall and stomach walls with a suture about the suture implement for living bodies and the suture approach for living bodies of suturing a living body's section for a suture.
[Background of the Invention]
[0002]
In case a patient is equipped with the catheter for gastric fistula, it is common that suture an abdominal wall and stomach walls with a suture, fix stomach walls to an abdominal wall temporarily, carry out the puncture of an abdominal wall and the stomach walls after that, form a through tube, and the through tube is equipped with the catheter for gastric fistula.
And the suture implement for suturing the stomach walls and the abdominal wall which are the section for a suture is developed variously.
[0003]
For example, the reusable puncture needle for suture insertion of the hollow which has the aisleway where a suture is inserted in the patent reference 1, The reusable puncture needle for suture grasping of the hollow used in order to be arranged at it and parallel and to grasp a suture, In the suture implement which consists of a holddown member which fixes the stylette inserted possible [sliding in the reusable puncture needle for suture grasping], and the reusable puncture needle for suture insertion and the reusable puncture needle for suture grasping in each end face section It has the annular member made from a spring material which can be contained to the aisleway of the reusable puncture needle for suture grasping at the tip of the stylette. What was constituted so that the medial axis of the reusable puncture needle for suture insertion or its production might pass through the interior of an annular member in the condition that the annular member was exposed from the tip of the reusable puncture needle for suture grasping and it might extend toward the reusable puncture needle for suture insertion is indicated.
[0004]
If the above-mentioned suture implement is used, will carry out the puncture of the reusable puncture needle for suture insertion, and the reusable puncture needle for suture grasping to an abdominal wall and stomach walls, and the stylette and an annular member will be inserted from the back end in the reusable puncture needle for suture grasping. Expose an annular member from the tip of the reusable puncture needle for suture grasping, and a suture is inserted from the back end in the reusable puncture needle for suture insertion. Expose some of sutures concerned from the tip of the reusable puncture needle for suture insertion, and the suture concerned is made to catch by the annular member. The stomach walls and the abdominal wall which are the section for a suture can be sutured by retreating the stylette in the reusable puncture needle for suture grasping, retreating the reusable puncture needle for suture insertion, the reusable puncture needle for suture grasping, the stylette, and an annular member in one, and pulling out the precedence section of a suture outside of the body.

[Patent reference 1] JP,6-24533,B
[Description of the Invention]
[Problem(s) to be Solved by the Invention]
[0005]
Although it is necessary to double the location of a ring with the location through which operates from the outside of the body and the tip of a suture passes so that a suture may pass through the inside of an annular member within the stomach when suturing the section for a suture using the above suture implements, the actuation may be difficult for an operator.
Then, this invention aims at improving the operability in the suture implement for living bodies and the suture approach for living bodies of suturing the section for a suture with a suture.
[Means for Solving the Problem]
[0006]
In order to attain the above-mentioned purpose, in the suture implement for living bodies and the suture approach for living bodies concerning this invention, we decided to pull out the point of the suture to which the point of a suture was inserted in a living body's section for a suture, the point of the inserted suture was adsorbed the department for a suture, and it stuck with the adsorption means from the section for a suture.
The 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with which each has an aisleway and more specifically carries out the puncture of the section for a suture with a juxtaposition posture in the suture implement for living bodies, When it was in the condition that connect with a suture, it is contained in the aisleway of the 1st hollow reusable puncture needle in front of the puncture, and the insertion object which can be inserted into a path from the tip of the 2nd hollow reusable puncture needle, and the front end were exposed from the 2nd hollow reusable puncture needle, we decided to prepare the adsorbent which adsorbs the insertion object extruded with the extrusion means.
[0007]
Moreover, the puncture step which carries out the puncture of the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with which each has an aisleway to a living body's section for a suture with a juxtaposition posture in the stomach-walls fixed approach, The extrusion step which extrudes the insertion object connected with the suture from the inside of the aisleway of the 1st hollow reusable puncture needle after a puncture step at a tip side, The arrangement step which arranges the adsorbent which adsorbs an insertion object so that the front end may be exposed from the tip of the 2nd hollow reusable puncture needle, We decided to prepare the approach step made to adsorb by making the insertion object extruded at the extrusion step approach the adsorbent arranged at the arrangement step, and the lead-in step which draws the adsorbent in the condition of having adsorbed the insertion object in an aisleway from the tip of the 2nd hollow reusable puncture needle.
[0008]
Here, it is desirable to form both an insertion object, and both [one side or] magnetically. Or it has the property which pays an insertion object and adsorbent well mutually with static electricity, and you may constitute.
In the above-mentioned stomach-walls fastener, it is still more desirable to form a means to make the insertion object extruded from the 1st hollow reusable puncture needle approach in the adsorbent in the condition that the tip was exposed from the aisleway tip side of the 2nd hollow reusable puncture needle.
[0009]
In the above-mentioned stomach-walls fastener, it is desirable to establish to form the holder which holds the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with a juxtaposition posture and the extrusion means which extrudes an insertion object from the aisleway tip of the 1st hollow reusable puncture needle to the method of outside, and the lead-in means which draws the adsorbent in the condition of having adsorbed the insertion object in an aisleway from the tip of the 2nd hollow reusable puncture needle.

While having the aisleway in which a suture is made to insert as the above-mentioned extrusion means, it is desirable to use the slide rod which slides the aisleway of the 1st hollow reusable puncture needle, and extrudes the insertion object concerned from the aisleway of the 1st hollow reusable puncture needle to a tip side in contact with the back end of an insertion object.
[0010]
The front end section of this slide rod may be formed with an elastic body.
In order to make the insertion object extruded as mentioned above approach adsorbent, when the point is projected from the tip of the 1st hollow reusable puncture needle, what has the property crooked in the tip side of the 2nd hollow reusable puncture needle may be used as a slide rod. Or you may contain in the 1st hollow reusable puncture needle in the condition of having been bent in the near part where a suture is connected by the insertion object before a puncture.
[0011]
Moreover, it is also desirable to form an insertion object in the shape of a rod, and to connect a suture to the end section. It is desirable to consider as the configuration in which a part of circle cut and lacked the cross-section configuration of an insertion object here. Moreover, it is also desirable to form the end section of an insertion object in tubed, to join a suture to an insertion object within the cylinder of the end section concerned, and to contain the bending part in a suture to the space in a cylinder of a top Norikazu edge in the rockable condition centering on the part joined to the insertion object.
[0012]
Moreover, it is also desirable to form slitting to which a bending part enters into the barrel wall of the end section.
[Effect of the Invention]
[0013]
While carrying out the puncture of an abdominal wall and the stomach walls to the above-mentioned stomach-walls fastener list with the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle according to the stomach-walls fixed approach and extruding an insertion object from the aisleway of the 1st hollow reusable puncture needle to a tip side, it changes into the condition of having exposed the front end of adsorbent from the 2nd hollow reusable puncture needle, and an insertion object will be adsorbed by adsorbent if the insertion object extruded with the extrusion means is brought close to adsorbent.
Here, only by making an insertion object and adsorbent approach within the stomach, since adsorbent is adsorbed, an insertion object does not have to carry out alignment of an insertion object and the adsorbent correctly, and actuation is comparatively easy.
[0014]
And if the adsorbent in the condition of having adsorbed the insertion object is drawn in an aisleway from the tip of the 2nd hollow reusable puncture needle and the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle are sampled from an abdominal wall, an abdominal wall and stomach walls are penetrated, and a suture is inserted into the stomach, penetrates stomach walls and an abdominal wall again, and will be in the condition of escaping and coming out to the outside of the body.
If both an insertion object, and both [one side or] are formed magnetically, by the magnetism, an insertion object will be strong to adsorbent and it will adsorb. Therefore, it is easy to also make an insertion object stick to adsorbent the department for a suture.
[0015]
If the holder which holds the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with a juxtaposition posture further is formed in the above-mentioned stomach-walls fastener, during actuation, it is stabilized and actuation which carries out the puncture of the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle can be performed.
If the slide rod which slides the aisleway of the 1st hollow reusable puncture needle, and extrudes an insertion object from the aisleway of the 1st hollow reusable puncture needle to a tip side in contact with the back end of an insertion object is used while having the aisleway in which a suture is made to insert,

it can perform easily extruding an insertion object from the aisleway of the 1st hollow reusable puncture needle to a tip side. If the front end section of this slide rod is formed with an elastic body, it will be stopped that a suture is caught in the front end section of a slide rod.
[0016]
Moreover, if what has the property crooked in the tip side of the 2nd hollow reusable puncture needle is used as a slide rod when the point is projected from the tip of said 1st hollow reusable puncture needle, the insertion object extruded from the 1st hollow reusable puncture needle can be made to approach adsorbent.
In or the condition of having been bent in the near part where a suture is connected by the insertion object before a puncture By extruding an insertion object to a tip side and drawing it again from the aisleway of the 1st hollow reusable puncture needle, if it contains in the 1st hollow reusable puncture needle The bending part concerned can be opened by part for the point of the 1st hollow reusable puncture needle, and an insertion object can be made to approach the adsorbent placed by exposing from the tip of the 2nd hollow reusable puncture needle.
[0017]
Furthermore, if an insertion object is formed in the shape of a rod and a suture is connected to the end section, the insertion object concerned can be rotated centering on a top Norikazu edge, and the other end can be made to approach adsorbent by opening a bending part by part for the point of the 1st hollow reusable puncture needle.
Here, in this notching part, if it is made the configuration in which a part of circle cut and lacked the cross section of an insertion object, since the clearance between the wall of the 1st hollow reusable puncture needle and an insertion object becomes large, a tooth space for a suture to pass is securable.
[0018]
Moreover, form the end section of an insertion object in tubed, join a suture to an insertion object within the cylinder of the end section concerned, and if the bending part in a suture is contained to the space in a cylinder of a top Norikazu edge in the rockable condition centering on the part joined to the insertion object Since the barrel wall of an insertion object contacts a part for the point of the 1st hollow reusable puncture needle concerned in case a bending part is opened by part for the point of the 1st hollow reusable puncture needle, the force in which a suture is pushed at the tip of the 1st hollow reusable puncture needle is mitigated. Therefore, it is avoidable that a suture is cut at the tip of the 1st hollow reusable puncture needle.
[0019]
Moreover, if slitting to which a bending part enters into the barrel wall of the end section is formed, since the range which can rock a bending part will spread, when a bending part passes the point of the 2nd hollow reusable puncture needle, the suture near [concerned] the bending part stops being caught in the point concerned easily.
[Best Mode of Carrying Out the Invention]
[0020]
although the stomach-walls fixed approach is hereafter explained to the stomach-walls fastener list for suturing stomach walls to an abdominal wall as 1 operation gestalt of this invention, this invention has been widely applied by pulling out besides the section for a suture, not only when suturing stomach walls to an abdominal wall, but after inserting the tip of a suture into a living body's section for a suture, when suturing the section for a suture.
[The gestalt 1 of operation]
Drawing 1 is the perspective view showing the appearance of the stomach-walls fastener 1 concerning the gestalt 1 of operation.
[0021]
The stomach-walls fastener 1 consists of the body section 10 and an insurance support device 40 which supports the body section 10 concerned on an abdominal wall, or covers a reusable puncture needle.
The holder section 12 prepared so that the body section 10 might spread in the direction of a path of the maintenance cylinder 11 [near the front end of the maintenance cylinder 11 and the maintenance

cylinder 11 concerned], The 1st hollow reusable puncture needles 14a and 14b and the 2nd hollow reusable puncture needles 15a and 15b which were held by the holder section 12 concerned in the state of juxtaposition, It consists of drawing-out implements 30 for drawing in the yarn delivery device 20 and Sutures 17a and 17b which send Sutures 17a and 17b into the tip side of the hollow reusable puncture needles 14a and 14b from the tip of the hollow reusable puncture needles 15a and 15b etc.
[0022]
In addition, it is inserted in the aisleway of the maintenance cylinder 11 in the condition which can slide the bearing bar 41 which constitutes the insurance support device 40.
It is desirable to use as a suture, the powerful yarn, for example, the nylon yarn, of the waist.
(Configuration of the body section 10)
The reusable puncture needle set in which 1st hollow reusable puncture needle 14a and 2nd hollow reusable puncture needle 15a make suture 17a insert is constituted, and the reusable puncture needle set in which 1st hollow reusable puncture needle 14b and 2nd hollow reusable puncture needle 15b make suture 17b insert is constituted. And the maintenance cylinder 11 is located in the middle of two reusable puncture needle sets.
[0023]
Drawing 2 is the sectional view which cut the body section 10 along the flat surface containing 1st hollow reusable puncture needle 14a and 2nd hollow reusable puncture needle 15a.
The holder section 12 had the tabular holder member 121 and the tabular holder member 122 which opened spacing in the direction of medial-axis X, and were put side by side in it, and the reinforcement member 123 which reinforces junction in both the holder member 121,122 and the maintenance cylinder 11 has fixed it between both the holder members 121,122.
[0024]
Each hollow reusable puncture needles 14a, 14b, 15a, and 15b are joined to these, after the back end part has penetrated the holder member 121, after the central approach part has penetrated the holder member 122, it is joined to these, and to the medial axis X of the maintenance cylinder 11, each hollow reusable puncture needles 14a, 14b, 15a, and 15b are stabilized in parallel, and are held by it.
Moreover, the end face inclines to a medial axis X, and the front end of each hollow reusable puncture needles 14a, 14b, 15a, and 15b is sharp so that the puncture of a patient's abdominal wall and stomach walls can be carried out.
[0025]
The interior of the 1st hollow reusable puncture needles 14a and 14b serves as a path in which Sutures 17a and 17b are made to insert to a tip side from the back end side. And the insertion objects 18a and 18b (in drawing 1 , it is in the hollow reusable puncture needles 14a and 14b, and is not visible.) which make the drawing-out implement 30 stick to the point of Sutures 17a and 17b Referring to drawing 2 is attached. These insertion objects 18a and 18b are explained in full detail later.
[0026]
On the other hand, the drawing-out implement 30 consists of the straight-line-like rod sections 31a and 31b and the connection section 32 which connects the back end sides of the rod sections 31a and 31b.
The rod sections 31a and 31b of the drawing-out implement 30 are inserted in the aisleway of the hollow reusable puncture needles 15a and 15b possible [a slide] from the back end side.
Moreover, in each point of the rod sections 31a and 31b, it is Adsorbent 33a and 33b (in drawing 1 , it is in the hollow reusable puncture needles 15a and 15b, and is not visible.). Referring to drawing 2 is prepared. Here, what has the property which draws the above-mentioned insertion objects 18a and 18b and Adsorbent 33a and 33b mutually is used. Specifically, a magnet is used for insertion object 18a and 18b list at Adsorbent 33a and 33b.
[0027]
In addition, the insertion objects 18a and 18b can be contained in the aisleway of the 1st hollow reusable puncture needles 14a and 14b, can be slid ahead, and can slide Adsorbent 33a and 33b into an aisleway from the front end of the 2nd hollow reusable puncture needles 15a and 15b.
The maintenance cylinder 11 and the holder section 12 are synthetic-resin mold goods, each hollow

reusable puncture needles 14a, 14b, 15a, and 15b are formed with a metallic conduit, and the drawing-out implement 30 is formed with the metal wire.
[0028]
In the body section 10 of the above-mentioned configuration to the point of Sutures 17a and 17b While the insertion objects 18a and 18b are attached, to each point of the rod sections 31a and 31b Since Adsorbent 33a and 33b is formed, after carrying out the puncture of the 1st hollow reusable puncture needles 14a and 14b and the 2nd hollow reusable puncture needles 15a and 15b into the stomach While extruding the insertion objects 18a and 18b in the stomach from the tip of the 1st hollow reusable puncture needles 14a and 14b The insertion objects 18a and 18b can be made to stick to Adsorbent 33a and 33b by exposing Adsorbent 33a and 33b from the tip of the 2nd hollow reusable puncture needles 15a and 15b, and making it approach within the stomach with the insertion objects 18a and 18b and Adsorbent 33a and 33b.
[0029]
And in the condition of having made the insertion objects 18a and 18b sticking to Adsorbent 33a and 33b, if the drawing-out implement 30 is lengthened back, Sutures 17a and 17b will be drawn with Adsorbent 33a and 33b from the front end of the 2nd hollow reusable puncture needles 15a and 15b. By Sutures' 17a and 17b entering in the stomach from the outside of an abdominal wall by sampling the hollow reusable puncture needles 14a, 14b, 15a, and 15b from an abdominal wall, and making a U-turn, since it escapes out of an abdominal wall and comes out, the stomach-walls immobilization by the suture is completed ** and by [which carry out partial association] having come out of each sutures 17a and 17b out of the abdominal wall.
[0030]
Hereafter, the suture approach is further explained to each device list with which the stomach-walls fastener 1 is equipped at a detail.
(Device which extrudes the insertion objects 18a and 18b from the tip of the hollow reusable puncture needles 14a and 14b)
It is inserted in the aisleway of the 1st hollow reusable puncture needles 14a and 14b in the condition which can slide the hollow capillary-like slide rods 16a and 16b, and Sutures 17a and 17b have penetrated the aisleway of the slide rods 16a and 16b. And the back end of the slide rods 16a and 16b was equipped with the head members 19a and 19b in the air, and the centrum is penetrated to it in the condition which can slide Sutures 17a and 17b. It is desirable to use a metallic conduit for the slide rods 16a and 16b.
[0031]
These head members 19a and 19b cannot enter the interior of the 1st hollow reusable puncture needles 14a and 14b, but make the work as a stopper which prevents the slide rods 16a and 16b advancing ahead more than it. Moreover, the head members 19a and 19b taper off so that it may be easy to insert in the pore of the grasping valve elements 232a and 232b mentioned later, and they serve as a configuration. It is desirable to use synthetic-resin mold goods for the head members 19a and 19b.
[0032]
An operator can extrude ahead the insertion objects 18a and 18b which were made to slide these slide rods 16a and 16b, and were contained inside the 1st hollow reusable puncture needles 14a and 14b by having such slide rods 16a and 16b.
in addition -- if the configuration of the slide rods 16a and 16b may not necessarily be a hollow capillary-like, and Sutures 17a and 17b can insert in the aisleway of the 1st hollow reusable puncture needles 14a and 14b and the slide rods 16a and 16b can be slid -- the configuration of the slide rods 16a and 16b -- a solid -- it may be cylindrical.
[0033]
(Yarn delivery device 20)
The arms 21a and 21b extended behind the 1st hollow reusable puncture needles 14a and 14b are attached in the holder member 122, and the hollow capillaries 22a and 22b are attached in it at the back end section of these arms 21a and 21b so that it may be located on a production behind the 1st hollow

reusable puncture needles 14a and 14b.
[0034]
These hollow capillaries 22a and 22b are held possible [a slide of the sutures 17a and 17b which penetrate that aisleway], and Sutures 17a and 17b are held by this possible [a slide] in the condition of having been built between the back end of the slide rods 16a and 16b, and the hollow capillaries 22a and 22b.
The yarn delivery device 20 is a device sent in ahead of the 1st hollow reusable puncture needles 14a and 14b by grasping the sutures 17a and 17b over which it was built behind the 1st hollow reusable puncture needles 14a and 14b in this way in the grasping section, and making it slide in the direction which makes the grasping section approach the hollow reusable puncture needles 14a and 14b at the back end. Hereafter, the example is explained.
[0035]
As shown in drawing 1 and 2, it is equipped with the slide plate 23 so that Sutures 17a and 17b may be penetrated between the hollow capillaries 22a and 22b and the head members 19a and 19b.
The grasping valve elements 232a and 232b for grasping Sutures 17a and 17b are joined by sheet metal 231, and the slide plate 23 is constituted.
Sheet metal 231 has the magnitude which is easy to hold by hand, the hole which makes the maintenance cylinder 11 and Arms 21a and 21b other than the hole which makes Sutures 17a and 17b penetrate penetrate is also established, and an operator can slide it now along with the maintenance cylinder 11 and Arms 21a and 21b.
[0036]
On the other hand, it is formed with a spring material (for example, rubber, an elastomeric material) with large coefficient of friction with Sutures 17a and 17b, and the pore which can penetrate Sutures 17a and 17b is established, and the pore of Sutures 17a and 17b concerned is pinched in the condition that Sutures 17a and 17b have penetrated directly, by the internal surface of grasping valve element 232a and 232b pore, and the grasping valve elements 232a and 232b are attached, and are grasped.
[0037]
Therefore, if sheet metal 231 is made to slide in the state of grasping whose grasping valve elements 232a and 232b are grasping Sutures 17a and 17b, Sutures 17a and 17b will also be conveyed in the slide direction concerned with the grasping valve elements 232a and 232b. On the other hand, in the condition that the hollow capillaries 22a and 22b or the head members 19a and 19b are inserted in the above-mentioned pore, grasping to the sutures 17a and 17b of the grasping valve elements 232a and 232b is canceled. Therefore, in the state of this discharge, the sutures 17a and 17b of each other can be slid smoothly, without being restrained by the slide plate 23.
[0038]
Therefore, when equipped with two or more slide plates 23, Sutures 17a and 17b can be conveyed by sum total slide distance by repeating the actuation to which change one sheet into a grasping condition at a time one by one, and the slide plate 23 is made to slide.
In addition, in the example shown in drawing 2 , although equipped with three slide plates 23, the distance which can convey Sutures 17a and 17b becomes large, so that the number of sheets of the slide plate 23 to attach is arbitrary and there is much the number of sheets.
[0039]
Drawing 11 is drawing explaining the function of the slide plate 23. In this drawing, the 2nd slide plate 23 is in the grasping condition from the inside of three slide plates 23, and before, the grasping valve elements 232a and 232b are inserted in the head members 19a and 19b, before to the 1st slide plate 23 will be in a discharge condition, the grasping valve elements 232a and 232b are inserted in the hollow capillaries 22a and 22b from before, and the 3rd slide plate 23 is in the discharge condition.
[0040]
Therefore, if the 2nd slide plate 23 is made to slide ahead in this condition, and it inserts in the head members 19a and 19b, and the 3rd [further] slide plate 23 is removed from the hollow capillaries 22a and 22b, and it changes into a grasping condition and is made to slide ahead, Sutures 17a and 17b will

be ahead conveyed by the sum total distance which two slide plates 23 slid.
In addition, as an example of the yarn delivery device 20, although the slide plate 23 which grasped Sutures 17a and 17b by the grasping valve elements 232a and 232b which consist of a spring material, and attached these grasping valve elements 232a and 232b in sheet metal 231 explained how to send out Sutures 17a and 17b, here The grasping section which grasps Sutures 17a and 17b is not restricted to a thing like the grasping valve elements 232a and 232b, for example, a clip can also be used for it. If Sutures 17a and 17b are attached in the same slide member as the slide plate 23 with the clip concerned also in this case, Sutures 17a and 17b will be grasped with a clip, and if a slide member is made to slide, Sutures 17a and 17b can be sent out to coincidence.
[0041]
(Detail configuration of the insertion objects 18a and 18b and Adsorbent 33a and 33b)
Drawing 3 (a) and (b) are the perspective views showing the configuration of insertion object 18a attached at the tip of suture 17a, and drawing 4 is the sectional view. In addition, although insertion object 18b does not illustrate, it is the same configuration as insertion object 18a.
The stick-like magnet 182 is inserted in, the insertion objects 18a and 18b are constituted by the notching metal tube 181 with which it cut and lacked in accordance with the shaft of a hollow cylinder, and the slit 186 was formed, and the appearance is also cylindrical. The above-mentioned magnet 182 is a neodymium magnet with a diameter [of 1mm], and a die length of 5mm, and is inserted in in the building envelope of the notching metal tube 181. Here, the magnet 182 is inserted in the point 184 approach in the notching metal tube 181, and the building envelope has become a cavity in the end face section 185 (point 184 and edge of the opposite side) side.
[0042]
The above-mentioned slit 186 is formed by width of face larger than the path of Sutures 17a and 17b so that Sutures 17a and 17b can pass.
Moreover, it was inserted into the notching metal tube 181 from the slit 186, the insertion part was bent, and the amount of [172] the point has pasted up suture 17a on the end face section 185 of the notching metal tube 181.
[0043]
Moreover, as shown in drawing 3 (b), in the end face section 185 of the notching metal tube 181, the slit 183 is formed in the above-mentioned notching and the location which counters in accordance with the shaft of a hollow cylinder.
In addition, the bending section 171 of suture 17a is located inside the end face so that it may be settled into the end face section 185 in the notching metal tube 181. Moreover, only the amount of [172] the point pastes up suture 17a on the inside of the notching metal tube 181 with adhesives, it bends according to the flexibility of suture 17a, and the section 171 can rock now the inside of the building envelope of the end face section 185.
[0044]
As shown in drawing 2 , the insertion objects 18a and 18b turn the end face section 185 to the tip side of the 1st hollow reusable puncture needles 14a and 14b, are in the condition that the bending section 171 broke into the acute angle, and was bent, and are contained in the 1st hollow reusable puncture needles 14a and 14b.
In addition, although Sutures 17a and 17b will pass through the clearance between the inner skin of the 1st hollow reusable puncture needles 14a and 14b, and the insertion objects 18a and 18b Since a part cuts and lacks in the notching metal tube 181 as mentioned above and the slit 186 is formed Even if the bore of the 1st hollow reusable puncture needles 14a and 14b and the outer diameter of the notching metal tube 181 are comparable, in the part which account[of a top]-cut and was lacked, the clearance space through which Sutures 17a and 17b pass will be formed between the inner skin of the 1st hollow reusable puncture needles 14a and 14b.
[0045]
Drawing 5 is the sectional view of adsorbent 33a. In addition, although adsorbent 33b does not illustrate, it is the same configuration as adsorbent 33a.

As shown in drawing 5 , the stick-like magnet 332 is inserted in the tip approach of the building envelope in a metal tube 331, the rod sections 31a and 31b are inserted, and the adsorbent 33a and 33b in the drawing-out implement 30 fixes and consists of end face sides of a metal tube 331. This magnet 332 and the above-mentioned magnet 182 serve as reversed polarity so that tip sides may draw each other.

[0046]

In addition, it escapes on the wall surface of a side far from the 1st hollow reusable puncture needles 14a and 14b, and the hole 152 is formed in the point of the 2nd hollow reusable puncture needles 15a and 15b. This recess hole 152 makes the work which prevents that Sutures 17a and 17b are caught in the inside point 151 of the 2nd hollow reusable puncture needles 15a and 15b, when the point concerned is bent and the section 171 passes.

(Device in which Sutures 17a and 17b are twisted)

The rotary knobs 50a and 50b for rotating Sutures 17a and 17b behind Arms 21a and 21b are attached in the sutures 17a and 17b concerned.

[0047]

The grasping valve elements 52a and 52b are joined by the hollow cylinder-like tongue members 51a and 51b, and these rotary knobs 50a and 50b are constituted.

Although the tongue members 51a and 51b are formed by the resin by which Sutures 17a and 17b can slide the centrum smoothly, pore is established so that the grasping valve elements 52a and 52b may be formed with a spring material with large coefficient of friction with Sutures 17a and 17b, and Sutures 17a and 17b can be penetrated and it may be bound tight.

[0048]

In the condition (condition from which the grasping valve elements 52a and 52b separated from the hollow capillaries 22a and 22b) that Sutures 17a and 17b have penetrated the above-mentioned pore directly by the above-mentioned configuration, by elasticity, the grasping valve elements 52a and 52b sandwich sutures 17a and 17, and grasp them. Therefore, Sutures 17a and 17b can be twisted by rotating rotary knobs 50a and 50b in the condition.

[0049]

On the other hand, where the pore of the grasping valve elements 52a and 52b is stabbed with the hollow capillaries 22a and 22b, Sutures 17a and 17b are twisted and inserted into the grasping valve elements 52a and 52b, and are canceled of the force. Therefore, it can slide in this condition, without Sutures 17a and 17b being restrained by rotary knobs 50a and 50b.

(insurance support device 40)

Drawing 6 is the sectional view which cut the stomach-walls fastener 1 along with the bearing bar 41, and shows the configuration of the insurance support device 40 especially. .

[0050]

The bearing bar 41 mentioned above is inserted in the condition which can be slid from the front of the maintenance cylinder 11. Since the maintenance cylinder 11 is located in the middle of two reusable puncture needle sets as mentioned above, two reusable puncture needle sets will be arranged to the bearing bar 41 inserted in this maintenance cylinder 11 at the position of symmetry.

The pressing covering 42 pressed on the peritoneum is perpendicularly attached in the front end of this bearing bar 41 to the bearing bar 41. As shown in drawing 1 , the pressing covering 42 is the configuration which can cover each tip of the hollow reusable puncture needles 14a, 14b, 15a, and 15b, and the through tubes 421-424 which make each point of the hollow reusable puncture needles 14a, 14b, 15a, and 15b project ahead are established.

[0051]

Moreover, it is equipped with an elastic body 43 and the back end of the maintenance cylinder 11 is closed by the covering device material 44 at the backside [the bearing bar 41 in the maintenance cylinder 11]. This elastic body 43 is a member which makes the work which presses a bearing bar 41 and the covering device material 44 in the direction estranged mutually according to stability, when compressed, and coiled spring is specifically used.

Moreover, a holddown member 45 fixes to the covering device material 44, and the lock member 46 for locking the location of the bearing bar 41 to the body section 10 is attached in this holddown member 45 at it. In addition, the pinching plate 49 of a pair is attached so that these covering device material 44, a holddown member 45, and the lock member 46 may be put.

[0052]

It has the projecting part 47 which is rockable in being formed in the lock member 46 with the ingredient which has elastic force, and the claw part 471 is formed at the tip of a projecting part 47. On the other hand, a through tube 111 is established by the wall surface of the maintenance cylinder 11 so that a claw part 471 can enter the interior of a cylinder, and two or more crevices 48 into which the above-mentioned claw part 471 gets are established in it together with the direction of medial-axis X at the bearing bar 41.

Moreover, the release lever 472 for an operator to pull out a claw part 471 from a crevice 48 is also formed in the lock member 46.

[0053]

If an operator stuffs a bearing bar 41 into the body section 10 by such configuration, although energized in the direction which the body section 10 and a bearing bar 41 estrange, when an elastic body 43 is compressed, and an operator applies from outside the force which resists this energization force, a bearing bar 41 can also be further stuffed into the body section 10.

And by stuffing a bearing bar 41 into the body section 10, a claw part 471 gets into a crevice 48, and the location of the bearing bar 41 to the maintenance cylinder 11 is locked. If an operator operates a release lever 472 and pulls out a claw part 471 from a crevice 48, since a lock will be canceled on the other hand, a bearing bar 41 can be made to slide to the maintenance cylinder 11.

[0054]

Here, in a bearing bar 41, since two or more crevices 48 are installed successively in the direction of medial-axis X, a bearing bar 41 can be locked to the maintenance cylinder 11 in two or more locations. Therefore, the amount of protrusions of the hollow reusable puncture needles 14a, 14b, 15a, and 15b to the pressing covering 42 can be adjusted by choosing the crevice 48 in which a claw part 471 is inserted in two or more crevices 48.

(Explanation of the actuation sutured with the stomach-walls fastener 1)

How to suture an abdominal wall and stomach walls using the above-mentioned stomach-walls fastener 1 is explained.

[0055]

Since the insertion objects 18a and 18b are contained inside the 1st hollow reusable puncture needles 14a and 14b and Adsorbent 33a and 33b is also contained inside the 2nd hollow reusable puncture needles 15a and 15b as shown in drawing 1 and 2 when the stomach-walls fastener 1 is in an early condition, the point of each hollow reusable puncture needles 14a, 14b, 15a, and 15b is in the sharp condition. However, since the tip of the hollow reusable puncture needles 14a, 14b, 15a, and 15b is located more back than the front face of the pressing covering 42, incorrect puncture prevention of it is carried out.

[0056]

The following actuation is performed inserting an endoscope into the stomach and supervising the condition inside the stomach.

(1) Puncture step :

An operator arranges the stomach-walls fastener 1 so that the pressing covering 42 may contact the predetermined location which is going to suture on an abdominal wall 60. Usually, if the location of a bearing bar 41 is doubled with the location (the inside of drawing 7 , an arrow head A) which is going to insert a **** catheter in stomach walls 61, the pressing covering 42 is mostly located in a predetermined location.

[0057]

And if the back end part (drawing 7 outline pointer) of the body section 10 is pushed in, an operator

The body section 10 slides ahead to a bearing bar 41, an abdominal wall 60 is approached, and it follows on it. The amount of [of the hollow reusable puncture needles 14a, 14b, 15a, and 15b] point The through tubes 421-424 of the pressing covering 42 are penetrated, further, the puncture of an abdominal wall 60 and the stomach walls 61 is carried out, and the tip of the hollow reusable puncture needles 14a, 14b, 15a, and 15b reaches in the stomach. Although an elastic body 43 will be in the condition of it being compressed and pressing a bearing bar 41 ahead, at this time, when a claw part 471 arrives at the location of a crevice 48, a claw part 471 gets into a crevice 48, and the location of the bearing bar 41 to the maintenance cylinder 11 is locked.

[0058]

Thus, if the puncture is carried out inserting a claw part 471 in the crevice 48 by the side of the No. 1 back end first, operating a release lever 472, and inserting a claw part 471 in crevice of 2nd crevice [48 or 3rd] 48 -- one by one then in case a puncture is carried out, since the puncture depth of the hollow reusable puncture needles 14a, 14b, 15a, and 15b becomes large gradually, an operator can control the puncture depth easily.

[0059]

Drawing 7 shows the condition of having been locked while the puncture of the hollow reusable puncture needles 14a and 15a was carried out as mentioned above.

At this puncture step, while the hollow reusable puncture needles 14a, 14b, 15a, and 15b are stabilized perpendicularly and held to an abdominal wall 60 in the condition that 2 sets of reusable puncture needle sets have been arranged to a bearing bar 41 at the position of symmetry, a puncture is carried out.

[0060]

In addition, the insertion objects 18a and 18b and Adsorbent 33a and 33b are contained inside the hollow reusable puncture needles 14a, 14b, 15a, and 15b at this time.

(2) Step which sends a suture into the 2nd hollow reusable puncture needles 15a and 15b from the 1st hollow reusable puncture needles 14a and 14b :

By pushing in the drawing-out implement 30, an operator exposes the point of Adsorbent 33a and 33b from the tip of the hollow reusable puncture needles 15a and 15b, as shown in drawing 8 (b).

[0061]

With it, by extruding the slide rods 16a and 16b ahead, an operator extrudes the insertion objects 18a and 18b and the sutures 17a and 17b of the near from the tip of the hollow reusable puncture needles 14a and 14b to the space in the stomach, as shown in drawing 8 (b). In addition, if an operator makes the slide plate 23 located No. [1] ago slide ahead in case the slide rods 16a and 16b are extruded ahead, two slide rods 16a and 16b can be extruded to coincidence.

[0062]

It is maintained at the acute angle by the bending peculiarity, although the bending section 171 will be opened to some extent if the insertion objects 18a and 18b are extruded by the space in the stomach. In addition, if the head members 19a and 19b contact the back end of the 1st hollow reusable puncture needles 14a and 14b, the slide rods 16a and 16b will not be slid ahead any more.

Next, the end face section 185 of the insertion objects 18a and 18b is pulled back by pulling back Sutures 17a and 17b back to the point of the 1st hollow reusable puncture needles 14a and 14b. Although suture 17a and suture 17b may be back pulled according to an individual in order to pull back Sutures 17a and 17b back, you may pull back to coincidence using the slide plate 23 located above-mentioned No. [1] ago.

[0063]

Although the end face section 185 tends to be drawn into the hollow reusable puncture needles 14a and 14b by this, as shown in drawing 9 (a), the insertion objects 18a and 18b rotate towards the drawing Nakaya mark B (direction which the bending section 171 opens) by supporting the end face section 185 by the point 141 of the 1st hollow reusable puncture needles 14a and 14b.

Since the tip effective area of the 1st hollow reusable puncture needles 14a and 14b has turned to the 2nd hollow reusable puncture needles 15a and 15b at this time, when the end face section 185 is supported by the point 141, it is supported in the part near the 2nd hollow reusable puncture needles 15a

and 15b. Therefore, the insertion objects 18a and 18b rotate so that a point 184 may approach at the tip of the above-mentioned adsorbent 33a and 33b. And if a point 184 approaches at the tip of the above-mentioned adsorbent 33a and 33b, these will pull each other and will join together.
[0064]
In addition, in case the insertion objects 18a and 18b rotate as mentioned above, when the sense of surface of revolution shifts and a point 184 does not fully approach at the tip of Adsorbent 33a and 33b, a point 184 is close brought at the tip of Adsorbent 33a and 33b by twisting Sutures 17a and 17b using rotary knobs 50a and 50b.
In addition, as mentioned above, since the bending section 171 is settled into the end face section 185 in the notching metal tube 181, in this step, the end face section 185 of the notching metal tube 181 contacts the point 141 of the 1st hollow reusable puncture needles 14a and 14b. Therefore, it is avoidable that Sutures 17a and 17b are strongly pushed to a point 141, and are cut.
[0065]
Next, as shown in drawing 9 (b) and (c), while an operator makes the slide plate 23 slide ahead and sending out Sutures 17a and 17b, the insertion objects 18a and 18b which stuck to Adsorbent 33a and 33b are drawn in inside by pulling the drawing-out implement 30 back from the tip of the 2nd hollow reusable puncture needles 15a and 15b.
Drawing 10 is drawing explaining the function of the slit 183 formed in the notching metal tube 181.
[0066]
Since the slit 183 is formed in the insertion objects 18a and 18b as shown in drawing 10 , the bending section 171 can enter into a slit 183.
Although it is pushed against the inside point 151 and **** or ****** possibility is in the inside point 151 when the insertion objects 18a and 18b are drawn in the 2nd hollow reusable puncture needles 15a and 15b, and the near part of an include angle of the bending section 171 of Sutures 17a and 17b is large to a medial axis X Since the include angle to the medial axis X of the near part of Sutures 17a and 17b becomes less small when the bending section 171 enters into a slit 183 as mentioned above, it is hard coming to be caught in the inside point 151 of the 2nd hollow reusable puncture needles 15a and 15b.
[0067]
Moreover, since it escapes to the point of the 2nd hollow reusable puncture needles 15a and 15b and the hole 152 is formed, when the bending section 171 passes through this, it can also enter into the recess hole 152. Therefore, it is prevented further that Sutures 17a and 17b are caught in the inside point 151.
And an operator inserts the insertion objects 18a and 18b by lengthening the drawing-out implement 30 back to the interior of the hollow reusable puncture needles 15a and 15b. In addition, the drawing-out implement 30 may be drawn out further back, and the insertion objects 18a and 18b may be taken out of the back end of the hollow reusable puncture needles 15a and 15b.
[0068]
If there are few amounts of sends of Sutures 17a and 17b, in case the insertion objects 18a and 18b will be drawn out to a back end side here from the front end side of the hollow reusable puncture needles 15a and 15b The sutures 17a and 17b which exist near the point part of the slide rods 16a and 16b Although it is pulled in the direction of the hollow reusable puncture needles 15a and 15b and is easy to be caught in the point 141 of the part for a point and the hollow reusable puncture needles 14a and 14b of the slide rods 16a and 16b It can prevent that such connection generates Sutures 17a and 17b by fully performing a drawer ahead with a send.
[0069]
By drawing 11 , the 2nd slide plate 23 is made to slide ahead, and signs that Sutures 17a and 17b are sent out are shown. Thus, Sutures 17a and 17b can be sent out to coincidence by making it slide ahead [2nd slide plate 23 and 3rd / further / slide plate 23].
Above, outside an abdominal wall 60, from from, Sutures 17a and 17b pass along the inside of 1st hollow reusable puncture needle 14a and 14b, invade in the space in the stomach, and will be in the condition of making a U-turn and being inserted into 2nd hollow reusable puncture needle 15a and 15b.
[0070]

(3) The step which extracts a reusable puncture needle
If a claw part 471 is pulled out from a crevice 48 when an operator pushes a release lever 472, a bearing bar 41 will be ahead extruded to the body section 10 by the force which the lock to a bearing bar 41 is canceled and the elastic body 43 compressed tends to elongate.
In connection with it, as shown in drawing 12 , the body section 10 is pulled apart from an abdominal wall 60, and the hollow reusable puncture needles 14a, 14b, 15a, and 15b are extracted from an abdominal wall 60.
[0071]
Consequently, outside an abdominal wall 60, Sutures 17a and 17b penetrate an abdominal wall 60 and stomach walls 61, make a U-turn in the space in the stomach, penetrate stomach walls 61 and an abdominal wall 60, and will be left from from besides an abdominal wall 60.
Moreover, the pressing covering 42 is located ahead of the hollow reusable puncture needles 14a, 14b, 15a, and 15b, and covers the point of the hollow reusable puncture needles 14a, 14b, 15a, and 15b. Therefore, an incorrect puncture is prevented.
[0072]
Then, partial 173,174 exposed from the abdominal wall 60 in each sutures 17a and 17b are made to join in a ring etc.
Above the stomach-walls fixed actuation using the stomach-walls fastener 1 is completed, and stomach walls 61 are fixed to an abdominal wall 60 with Sutures 17a and 17b.
(Effectiveness by the stomach-walls fastener 1)
Since it is combined by the force in which make the insertion objects 18a and 18b only approach Adsorbent 33a and 33b, and the insertion objects 18a and 18b and Adsorbent 33a and 33b pay well mutually within the stomach, the actuation for seldom making alignment of the insertion objects 18a and 18b and Adsorbent 33a and 33b into accuracy, therefore making it join together is comparatively easy for an operator.
[0073]
Moreover, since an operator can make the insertion objects 18a and 18b approach Adsorbent 33a and 33b by actuation which pulls back Sutures 17a and 17b after extruding the insertion objects 18a and 18b from the 1st hollow reusable puncture needles 14a and 14b, actuation of making the insertion objects 18a and 18b approaching Adsorbent 33a and 33b is also easy.
Since an operator can turn out two sutures 17a and 17b once by operating the slide plate 23, he does not require time and effort like [in the case of letting out Sutures 17a and 17b separately].
[0074]
Since the hollow reusable puncture needles 14a, 14b, 15a, and 15b are held by the holder section 12 in the state of juxtaposition, the mutual location of the hollow reusable puncture needle of these plurality is maintained. Moreover, the hollow reusable puncture needles 14a, 14b, 15a, and 15b can be packed by one actuation, and a puncture can be carried out, or it can also extract.
By having the insurance support device 40, to an abdominal wall 60, the hollow reusable puncture needles 14a, 14b, 15a, and 15b are stabilized perpendicularly, and are held. Therefore, it excels in stability in case an operator operates the stomach-walls fastener 1 on an abdominal wall. Moreover, since the point of the hollow reusable puncture needles 14a, 14b, 15a, and 15b is covered with the pressing covering 42 before a puncture and after extracting a reusable puncture needle, an incorrect puncture can be prevented.
[0075]
[The gestalt 2 of operation]
The gestalt of this operation is an example currently formed with the ingredient with which the amount of [of a slide rod] point has resiliency.
Although the stomach-walls fastener 1 of the gestalt 2 of this operation is the same configuration as the stomach-walls fastener 1 of the gestalt 1 of the above-mentioned implementation, it differs in that it is equipped with the member which becomes the point of the slide rods 16a and 16b from a spring material. That is, although the slide rods 16a and 16b are formed with the metal which has rigidity, the

elastic tubular member 161 which consists of an ingredient which has resiliency is inserted in the point.
[0076]
Drawing 13 is the perspective view showing the elastic tubular member 161 inserted in the point of slide rod 16a.
It is desirable to use the thing to Sutures 17a and 17b which has small coefficient of friction as a spring material.
As an example of a spring material, they are natural rubber, polyisoprene rubber, butadiene rubber, a styrene butadiene rubber, nitrile rubber, chloroprene rubber, and isobutylene isoprene rubber. Various thermoplastic elastomer, such as acrylic rubber, ethylene-polo pyrene rubber, HIDORINGOMU, polyurethane rubber, silicone rubber, various rubber ingredients like a fluororubber, a styrene system, a polyolefine system, a polyvinyl chloride system, a polyurethane system, a polyester system, a polyamide system and a poly-butadiene system, a transformer polyisoprene system, a fluororubber system, and a chlorinated polyethylene system, is mentioned, and two or more sorts in this can also be mixed and used.
[0077]
Drawing 14 is drawing explaining the suture sending step concerning the gestalt of this operation.
Although it carries out like the gestalt 1 of operation in (2) suture sending step with this operation gestalt until it makes the insertion objects 18a and 18b stick to Adsorbent 33a and 33b Then, in case the drawing-out implement 30 is pulled back and the insertion objects 18a and 18b are drawn out to a back end side from the front end side of the hollow reusable puncture needles 15a and 15b, the elastic tubular member 161 is performed in the condition of having made it projecting ahead rather than the point 141 of the 1st hollow reusable puncture needles 14a and 14b.
[0078]
Although the sutures 17a and 17b which exist near the point part of the slide rods 16a and 16b are pulled in the direction of the hollow reusable puncture needles 15a and 15b in case the insertion objects 18a and 18b are drawn out to a back end side from the front end side of the hollow reusable puncture needles 15a and 15b as the gestalt 1 of the above-mentioned implementation described here Since a part for the point of the slide rods 16a and 16b is formed with the ingredient which has resiliency, it is bent by this operation gestalt by the amount of point concerned in the direction of the hollow reusable puncture needles 15a and 15b, and it guides Sutures 17a and 17b in the direction of the hollow reusable puncture needles 15a and 15b smoothly with it. Therefore, compared with the gestalt 1 of the above-mentioned implementation, Sutures 17a and 17b have stopped easily being caught in the 1st hollow reusable puncture needles 14a and 14b or the slide rods 16a and 16b.
[0079]
Therefore, even if it does not send out Sutures 17a and 17b like the gestalt 1 of the above-mentioned implementation from the tip of the 1st hollow reusable puncture needles 14a and 14b, it is also possible to only pull the drawing-out implement 30 back, and to draw Sutures 17a and 17b in the direction of the 1st hollow reusable puncture needles 14a and 14b to the 2nd hollow reusable puncture needles 15a and 15b.
(Modification)
Although the puncture of an abdominal wall 60 and the stomach walls 61 was carried out with the above-mentioned operation gestalt where the insertion objects 18a and 18b are contained to the building envelope of the 1st hollow reusable puncture needles 14a and 14b In the state of un-containing the insertion objects 18a and 18b, the puncture of an abdominal wall 60 and the stomach walls 61 may be carried out, and the insertion objects 18a and 18b may be inserted in the 1st hollow reusable puncture needles 14a and 14b after that from the back end of the 1st hollow reusable puncture needles 14a and 14b. In this case, the insertion objects 18a and 18b need to enable it to pass through the interior of the 1st hollow reusable puncture needles 14a and 14b from the back end to the front end.
[0080]
Although the device in which the insertion objects 18a and 18b were made to approach Adsorbent 33a and 33b by bending at the tip of the 1st hollow reusable puncture needles 14a and 14b, opening the

section 171, and rotating the rod-like insertion objects 18a and 18b was established with the above-mentioned operation gestalt If it can pass through the inside of 2nd hollow reusable puncture needle 15a and 15b and Adsorbent 33a and 33b can be made to approach Especially the configuration of the insertion objects 18a and 18b is not limited, for example, may attach the spherical insertion objects 18a and 18b in the point of the bending section 171 in Sutures 17a and 17b.

[0081]

Moreover, although it bent to Sutures 17a and 17b and the section 171 was formed with the above-mentioned operation gestalt in order to make the insertion objects 18a and 18b and Adsorbent 33a and 33b approach So that the front end part of the slide rods 16a and 16b may enable it to project from the tip of the 1st hollow reusable puncture needles 14a and 14b and the front end part may be crooked in the direction approaching the 2nd hollow reusable puncture needles 15a and 15b Even if it will bend the slide rods 16a and 16b to Sutures 17a and 17b if bending processing is performed beforehand, and it does not form the section 171, the insertion objects 18a and 18b and Adsorbent 33a and 33b can be made to approach.

[0082]

Or in the drawing-out implement 30, when the front end part is extruded from the tip of the 2nd hollow reusable puncture needles 15a and 15b Even if it bends beforehand and carries out so that it may be crooked in the direction in which Adsorbent 33a and 33b approaches the 1st hollow reusable puncture needles 14a and 14b, it bends to Sutures 17a and 17b similarly, and even if it does not form the section 171, the insertion objects 18a and 18b and Adsorbent 33a and 33b can be made to approach.

[0083]

Moreover, if tips attach the 1st hollow reusable puncture needles 14a and 14b and the 2nd hollow reusable puncture needles 15a and 15b in the holder section 12 in the condition of having made it inclining in the direction approached mutually Both can be made to approach only by extruding Adsorbent 33a and 33b linearly from the tip of the 2nd hollow reusable puncture needles 15a and 15b, while extruding the insertion objects 18a and 18b linearly from the tip of the 1st hollow reusable puncture needles 14a and 14b.

[0084]

Although the front end of the hollow reusable puncture needles 14a, 14b, 15a, and 15b was formed sharp with the above-mentioned operation gestalt Even if there is nothing sharp, the front end of the hollow reusable puncture needles 14a, 14b, 15a, and 15b If the end face section (end face section 185 of the notching metal tube 181) of the insertion objects 18a and 18b and the point of Adsorbent 33a and 33b are formed sharp, where these are made to project from the front end of the hollow reusable puncture needles 14a, 14b, 15a, and 15b, the puncture of an abdominal wall 60 and the stomach walls 61 can be carried out.

[0085]

With the above-mentioned operation gestalt, although the magnet was used for the insertion objects 18a and 18b and Adsorbent 33a and 33b, both may be formed with the magnetic substance and a magnet may be used only for either.

Moreover, the member which can electrify static electricity with which polarities differ mutually may be used for the insertion objects 18a and 18b and Adsorbent 33a and 33b instead of a magnet. In that case, since static electricity pulls the insertion objects 18a and 18b and Adsorbent 33a and 33b mutually, they can make the insertion objects 18a and 18b and Adsorbent 33a and 33b only able to approach, and can make the insertion objects 18a and 18b stick to Adsorbent 33a and 33b like the case of a magnet.

[0086]

Although the insurance support device 40 was formed in the stomach-walls fastener 1 with the above-mentioned operation gestalt, in this invention, the insurance support device 40 is not indispensable. Moreover, although the hollow reusable puncture needles 14a, 14b, 15a, and 15b were held in the holder section 12 with the stomach-walls fastener 1 in the above-mentioned operation gestalt Even if the hollow reusable puncture needle does not necessarily need to be held with an electrode holder in this invention, for example, it carries out the puncture of the hollow reusable puncture needles 14a, 14b, 15a,

and 15b to an abdominal wall and stomach walls according to an individual Similarly, the insertion objects 18a and 18b can be made to be able to stick to Adsorbent 33a and 33b, and Sutures 17a and 17b can be sent into the 2nd hollow reusable puncture needles 15a and 15b from the 1st hollow reusable puncture needles 14a and 14b.

[Availability on industry]

[0087]

In case the suture implement for living bodies and the suture approach for living bodies concerning this invention equip with the catheter for gastric fistula, they are suitable for suturing an abdominal wall and stomach walls with a suture.

[Brief Description of the Drawings]

[0088]

[Drawing 1] It is the appearance perspective view of the stomach-walls fastener concerning the gestalt of operation.

[Drawing 2] It is the sectional view showing the cross section which cut the body section 10 along the flat surface containing 1st hollow reusable puncture needle 14a and 2nd hollow reusable puncture needle 15a.

[Drawing 3] It is the perspective view showing the configuration of insertion object 18a attached at the tip of suture 17a.

[Drawing 4] It is the sectional view of insertion object 18a.

[Drawing 5] It is the sectional view of adsorbent 33a attached in the drawing-out implement 30.

[Drawing 6] It is the sectional view of the stomach-walls fastener 1.

[Drawing 7] It is drawing explaining the puncture step which carries out the puncture of the hollow reusable puncture needle.

[Drawing 8] It is drawing explaining the step which sends a suture into the 2nd hollow reusable puncture needle from the 1st hollow reusable puncture needle.

[Drawing 9] It is drawing explaining the step which sends a suture into the 2nd hollow reusable puncture needle from the 1st hollow reusable puncture needle.

[Drawing 10] It is drawing explaining the function of the slit formed in the notching metal tube.

[Drawing 11] It is drawing explaining the function of the slide plate 23.

[Drawing 12] It is drawing explaining the step which extracts a hollow reusable puncture needle.

[Drawing 13] It is the perspective view showing the elastic tubular member 161 inserted in the point of slide rod 16a concerning the gestalt 2 of operation.

[Drawing 14] It is drawing explaining the suture sending step concerning the gestalt 2 of operation.

[Description of Notations]

[0089]

1 Stomach-Walls Fastener
10 Body Section
11 Maintenance Cylinder
12 Holder Section
14a, 14b, 15a, 15b Hollow reusable puncture needle
16a, 16b Slide rod
17a, 17b Suture
18a, 18b Insertion object
19a, 19b Head member
20 Yarn Delivery Device
22a, 22b Hollow capillary
23 Slide Plate
30 Drawing-Out Implement
33a, 33b Adsorbent
40 Insurance Support Device
41 Bearing Bar

42 Pressing Covering
43 Elastic Body
48 Crevice
52a, 52b Grasping valve element
161 Elastic Tubular Member
171 Bending Section
181 Notching Metal Tube
182 Magnet
186 Slit
231 Sheet Metal
232a, 232b Grasping valve element
332 Magnet
471 Claw Part

[Translation done.]

TECHNICAL FIELD

[Field of the Invention]
[0001]
This invention relates to the stomach-walls fastener and the stomach-walls fixed approach for suturing especially an abdominal wall and stomach walls with a suture about the suture implement for living bodies and the suture approach for living bodies of suturing a living body's section for a suture.

[Translation done.]

PRIOR ART

[Background of the Invention]
[0002]
In case a patient is equipped with the catheter for gastric fistula, it is common that suture an abdominal wall and stomach walls with a suture, fix stomach walls to an abdominal wall temporarily, carry out the puncture of an abdominal wall and the stomach walls after that, form a through tube, and the through tube is equipped with the catheter for gastric fistula.
And the suture implement for suturing the stomach walls and the abdominal wall which are the section for a suture is developed variously.
[0003]
For example, the reusable puncture needle for suture insertion of the hollow which has the aisleway where a suture is inserted in the patent reference 1, The reusable puncture needle for suture grasping of the hollow used in order to be arranged at it and parallel and to grasp a suture, In the suture implement which consists of a holddown member which fixes the stylette inserted possible [sliding in the reusable puncture needle for suture grasping], and the reusable puncture needle for suture insertion and the reusable puncture needle for suture grasping in each end face section It has the annular member made from a spring material which can be contained to the aisleway of the reusable puncture needle for suture grasping at the tip of the stylette. What was constituted so that the medial axis of the reusable puncture needle for suture insertion or its production might pass through the interior of an annular member in the condition that the annular member was exposed from the tip of the reusable puncture needle for suture grasping and it might extend toward the reusable puncture needle for suture insertion is indicated.
[0004]
If the above-mentioned suture implement is used, will carry out the puncture of the reusable puncture needle for suture insertion, and the reusable puncture needle for suture grasping to an abdominal wall and stomach walls, and the stylette and an annular member will be inserted from the back end in the reusable puncture needle for suture grasping. Expose an annular member from the tip of the reusable puncture needle for suture grasping, and a suture is inserted from the back end in the reusable puncture needle for suture insertion. Expose some of sutures concerned from the tip of the reusable puncture needle for suture insertion, and the suture concerned is made to catch by the annular member. The stomach walls and the abdominal wall which are the section for a suture can be sutured by retreating the stylette in the reusable puncture needle for suture grasping, retreating the reusable puncture needle for suture insertion, the reusable puncture needle for suture grasping, the stylette, and an annular member in one, and pulling out the precedence section of a suture outside of the body.
[Patent reference 1] JP,6-24533,B

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention]
[0013]
While carrying out the puncture of an abdominal wall and the stomach walls to the above-mentioned stomach-walls fastener list with the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle according to the stomach-walls fixed approach and extruding an insertion object from the aisleway of the 1st hollow reusable puncture needle to a tip side, it changes into the condition of having exposed the front end of adsorbent from the 2nd hollow reusable puncture needle, and an insertion object will be adsorbed by adsorbent if the insertion object extruded with the extrusion means is brought close to adsorbent.
Here, only by making an insertion object and adsorbent approach within the stomach, since adsorbent is adsorbed, an insertion object does not have to carry out alignment of an insertion object and the adsorbent correctly, and actuation is comparatively easy.
[0014]
And if the adsorbent in the condition of having adsorbed the insertion object is drawn in an aisleway from the tip of the 2nd hollow reusable puncture needle and the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle are sampled from an abdominal wall, an abdominal wall and stomach walls are penetrated, and a suture is inserted into the stomach, penetrates stomach walls and an abdominal wall again, and will be in the condition of escaping and coming out to the outside of the body.
If both an insertion object, and both [one side or] are formed magnetically, by the magnetism, an insertion object will be strong to adsorbent and it will adsorb. Therefore, it is easy to also make an insertion object stick to adsorbent the department for a suture.
[0015]
If the holder which holds the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with a juxtaposition posture further is formed in the above-mentioned stomach-walls fastener, during actuation, it is stabilized and actuation which carries out the puncture of the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle can be performed.
If the slide rod which slides the aisleway of the 1st hollow reusable puncture needle, and extrudes an insertion object from the aisleway of the 1st hollow reusable puncture needle to a tip side in contact with the back end of an insertion object is used while having the aisleway in which a suture is made to insert, it can perform easily extruding an insertion object from the aisleway of the 1st hollow reusable puncture needle to a tip side. If the front end section of this slide rod is formed with an elastic body, it will be stopped that a suture is caught in the front end section of a slide rod.
[0016]
Moreover, if what has the property crooked in the tip side of the 2nd hollow reusable puncture needle is used as a slide rod when the point is projected from the tip of said 1st hollow reusable puncture needle, the insertion object extruded from the 1st hollow reusable puncture needle can be made to approach adsorbent.

In or the condition of having been bent in the near part where a suture is connected by the insertion object before a puncture By extruding an insertion object to a tip side and drawing it again from the aisleway of the 1st hollow reusable puncture needle, if it contains in the 1st hollow reusable puncture needle The bending part concerned can be opened by part for the point of the 1st hollow reusable puncture needle, and an insertion object can be made to approach the adsorbent placed by exposing from the tip of the 2nd hollow reusable puncture needle.

[0017]

Furthermore, if an insertion object is formed in the shape of a rod and a suture is connected to the end section, the insertion object concerned can be rotated centering on a top Norikazu edge, and the other end can be made to approach adsorbent by opening a bending part by part for the point of the 1st hollow reusable puncture needle.

Here, in this notching part, if it is made the configuration in which a part of circle cut and lacked the cross section of an insertion object, since the clearance between the wall of the 1st hollow reusable puncture needle and an insertion object becomes large, a tooth space for a suture to pass is securable.

[0018]

Moreover, form the end section of an insertion object in tubed, join a suture to an insertion object within the cylinder of the end section concerned, and if the bending part in a suture is contained to the space in a cylinder of a top Norikazu edge in the rockable condition centering on the part joined to the insertion object Since the barrel wall of an insertion object contacts a part for the point of the 1st hollow reusable puncture needle concerned in case a bending part is opened by part for the point of the 1st hollow reusable puncture needle, the force in which a suture is pushed at the tip of the 1st hollow reusable puncture needle is mitigated. Therefore, it is avoidable that a suture is cut at the tip of the 1st hollow reusable puncture needle.

[0019]

Moreover, if slitting to which a bending part enters into the barrel wall of the end section is formed, since the range which can rock a bending part will spread, when a bending part passes the point of the 2nd hollow reusable puncture needle, the suture near [concerned] the bending part stops being caught in the point concerned easily.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]
[0005]
Although it is necessary to double the location of a ring with the location through which operates from the outside of the body and the tip of a suture passes so that a suture may pass through the inside of an annular member within the stomach when suturing the section for a suture using the above suture implements, the actuation may be difficult for an operator.
Then, this invention aims at improving the operability in the suture implement for living bodies and the suture approach for living bodies of suturing the section for a suture with a suture.

[Translation done.]

MEANS

[Means for Solving the Problem]
[0006]
In order to attain the above-mentioned purpose, in the suture implement for living bodies and the suture approach for living bodies concerning this invention, we decided to pull out the point of the suture to which the point of a suture was inserted in a living body's section for a suture, the point of the inserted suture was adsorbed the department for a suture, and it stuck with the adsorption means from the section for a suture.
The 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with which each has an aisleway and more specifically carries out the puncture of the section for a suture with a juxtaposition posture in the suture implement for living bodies, When it was in the condition that connect with a suture, it is contained in the aisleway of the 1st hollow reusable puncture needle in front of the puncture, and the insertion object which can be inserted into a path from the tip of the 2nd hollow reusable puncture needle, and the front end were exposed from the 2nd hollow reusable puncture needle, we decided to prepare the adsorbent which adsorbs the insertion object extruded with the extrusion means.
[0007]
Moreover, the puncture step which carries out the puncture of the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with which each has an aisleway to a living body's section for a suture with a juxtaposition posture in the stomach-walls fixed approach, The extrusion step which extrudes the insertion object connected with the suture from the inside of the aisleway of the 1st hollow reusable puncture needle after a puncture step at a tip side, The arrangement step which arranges the adsorbent which adsorbs an insertion object so that the front end may be exposed from the tip of the 2nd hollow reusable puncture needle, We decided to prepare the approach step made to adsorb by making the insertion object extruded at the extrusion step approach the adsorbent arranged at the arrangement step, and the lead-in step which draws the adsorbent in the condition of having adsorbed the insertion object in an aisleway from the tip of the 2nd hollow reusable puncture needle.
[0008]
Here, it is desirable to form both an insertion object, and both [one side or] magnetically. Or it has the property which pays an insertion object and adsorbent well mutually with static electricity, and you may constitute.
In the above-mentioned stomach-walls fastener, it is still more desirable to form a means to make the insertion object extruded from the 1st hollow reusable puncture needle approach in the adsorbent in the condition that the tip was exposed from the aisleway tip side of the 2nd hollow reusable puncture needle.
[0009]
In the above-mentioned stomach-walls fastener, it is desirable to establish to form the holder which holds the 1st hollow reusable puncture needle and the 2nd hollow reusable puncture needle with a juxtaposition posture and the extrusion means which extrudes an insertion object from the aisleway tip

of the 1st hollow reusable puncture needle to the method of outside, and the lead-in means which draws the adsorbent in the condition of having adsorbed the insertion object in an aisleway from the tip of the 2nd hollow reusable puncture needle.
While having the aisleway in which a suture is made to insert as the above-mentioned extrusion means, it is desirable to use the slide rod which slides the aisleway of the 1st hollow reusable puncture needle, and extrudes the insertion object concerned from the aisleway of the 1st hollow reusable puncture needle to a tip side in contact with the back end of an insertion object.
[0010]
The front end section of this slide rod may be formed with an elastic body.
In order to make the insertion object extruded as mentioned above approach adsorbent, when the point is projected from the tip of the 1st hollow reusable puncture needle, what has the property crooked in the tip side of the 2nd hollow reusable puncture needle may be used as a slide rod. Or you may contain in the 1st hollow reusable puncture needle in the condition of having been bent in the near part where a suture is connected by the insertion object before a puncture.
[0011]
Moreover, it is also desirable to form an insertion object in the shape of a rod, and to connect a suture to the end section. It is desirable to consider as the configuration in which a part of circle cut and lacked the cross-section configuration of an insertion object here. Moreover, it is also desirable to form the end section of an insertion object in tubed, to join a suture to an insertion object within the cylinder of the end section concerned, and to contain the bending part in a suture to the space in a cylinder of a top Norikazu edge in the rockable condition centering on the part joined to the insertion object.
[0012]
Moreover, it is also desirable to form slitting to which a bending part enters into the barrel wall of the end section.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[0088]
[Drawing 1] It is the appearance perspective view of the stomach-walls fastener concerning the gestalt of operation.
[Drawing 2] It is the sectional view showing the cross section which cut the body section 10 along the flat surface containing 1st hollow reusable puncture needle 14a and 2nd hollow reusable puncture needle 15a.
[Drawing 3] It is the perspective view showing the configuration of insertion object 18a attached at the tip of suture 17a.
[Drawing 4] It is the sectional view of insertion object 18a.
[Drawing 5] It is the sectional view of adsorbent 33a attached in the drawing-out implement 30.
[Drawing 6] It is the sectional view of the stomach-walls fastener 1.
[Drawing 7] It is drawing explaining the puncture step which carries out the puncture of the hollow reusable puncture needle.
[Drawing 8] It is drawing explaining the step which sends a suture into the 2nd hollow reusable puncture needle from the 1st hollow reusable puncture needle.
[Drawing 9] It is drawing explaining the step which sends a suture into the 2nd hollow reusable puncture needle from the 1st hollow reusable puncture needle.
[Drawing 10] It is drawing explaining the function of the slit formed in the notching metal tube.
[Drawing 11] It is drawing explaining the function of the slide plate 23.
[Drawing 12] It is drawing explaining the step which extracts a hollow reusable puncture needle.
[Drawing 13] It is the perspective view showing the elastic tubular member 161 inserted in the point of slide rod 16a concerning the gestalt 2 of operation.
[Drawing 14] It is drawing explaining the suture sending step concerning the gestalt 2 of operation.

[Translation done.]

* NOTICES *

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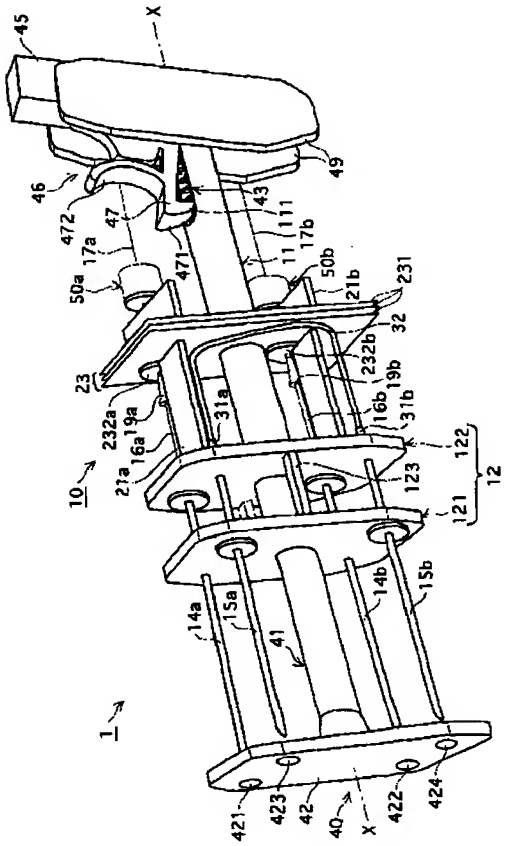
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



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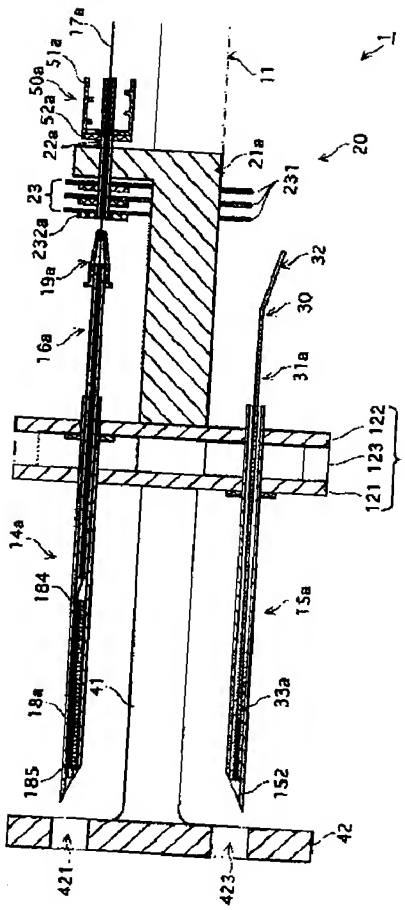
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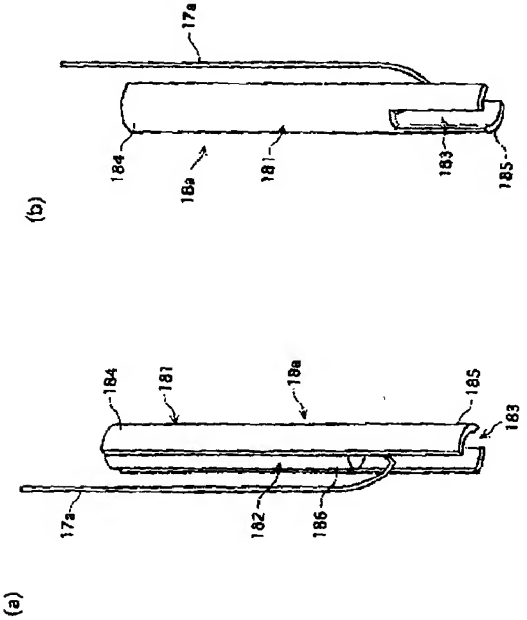
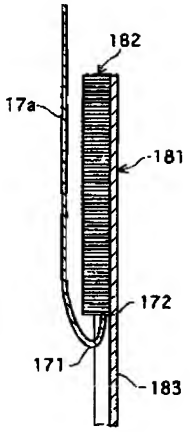
51a
50a
52a
22a
23
232a
19a
16a
1
11
20
21a
231
32
30
31a
12
121 123 122
14a
184
15a
18a
41
33a
185
152
42
421
423

[Drawing 3]


(b)
17a
184
18a
181
183
185
(a)
184
181
18a
185
183
17a
182
186

[Drawing 4]



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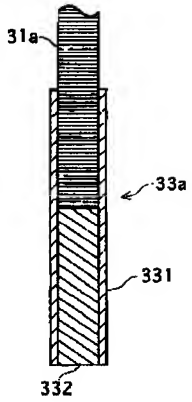

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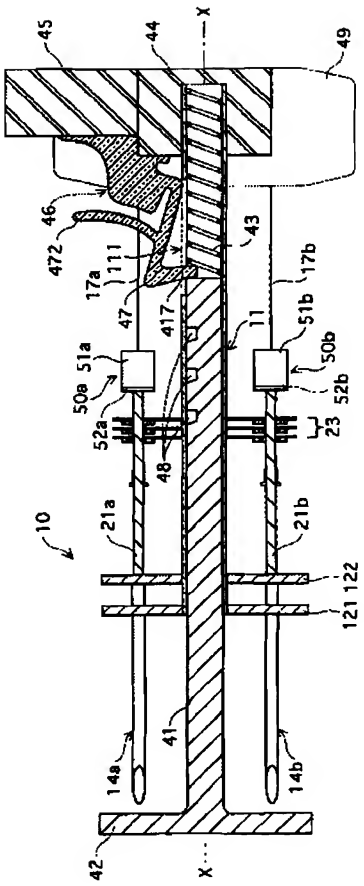
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43
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17b
47
417
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21b
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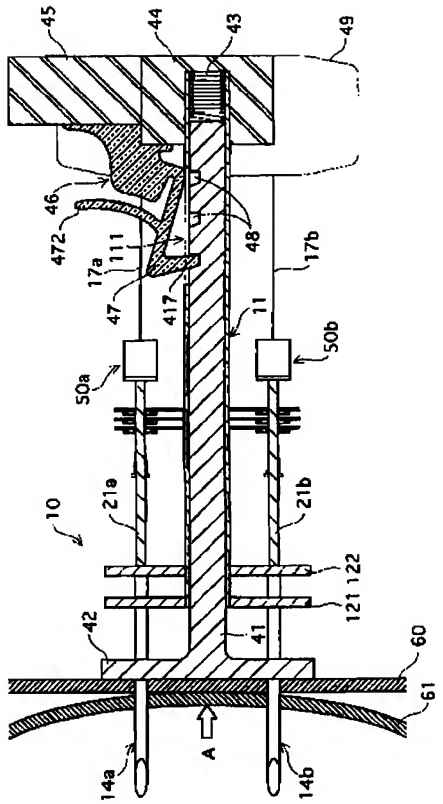
121
41
14a
14b
42
X

[Drawing 7]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17b
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417
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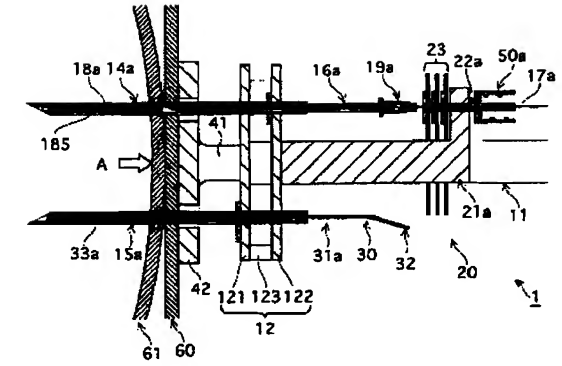
61
A
14a
14b

[Drawing 8]

(a)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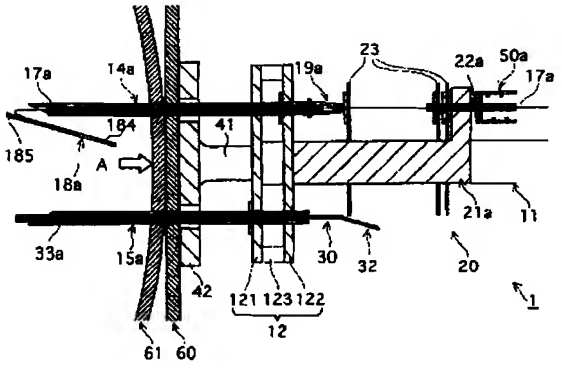
60

(b)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121 123 122
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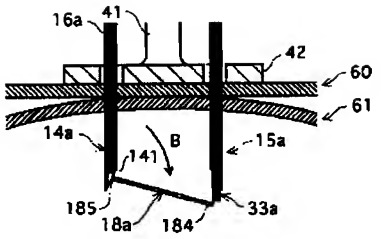
61
60

[Drawing 9]

(a)



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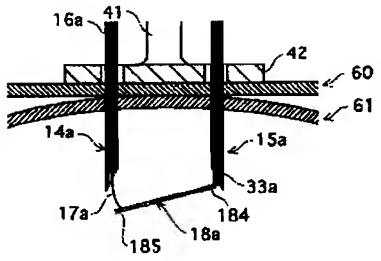

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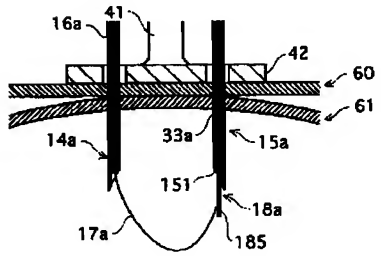

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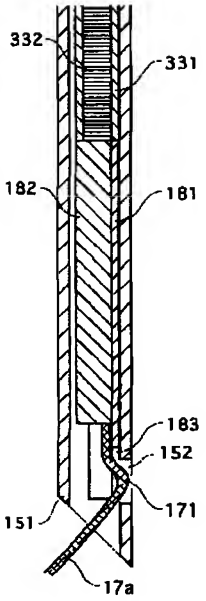

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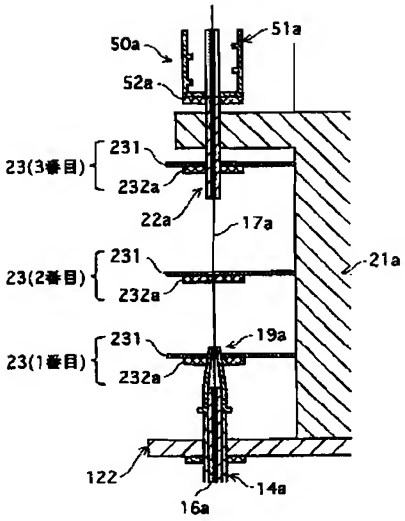

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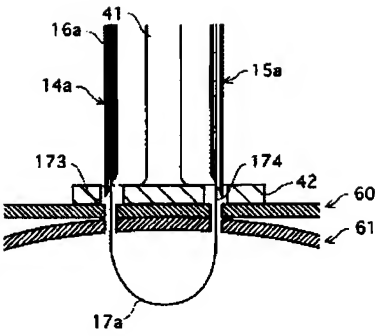
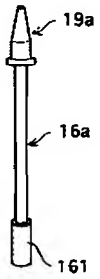
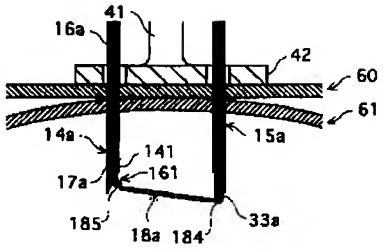


[Drawing 13]



[Drawing 14]



[Translation done.]